

REMARKS

Double Patenting Rejection

The Office Action provisionally rejects claims 1-19 based on obviousness-type double patenting over the claims of the parent application having a Serial No. 09/512,942.

In response to this rejection, Applicant files the attached Terminal Disclaimer to disclaim the term of a patent issued based on the present application that would extend beyond the term of a patent issued based on the parent application. Filing of the Terminal Disclaimer is believed to overcome this rejection.

Rejections Under 35 U.S.C. 102

The Office Action rejects claims 1-19 as being anticipated by the teachings of U.S. Patent No. 4,336,319 of Nagashima. Applicant respectfully traverses these rejections for the following reasons.

Claim 1 recites a photoresist composition that includes a resin binder, and an encapsulated material having inorganic particles that are *at least partially coated with a moiety having a protected acidic group*.

Nagashima is directed to light-solubilizable compositions that are suitable for producing lithographic printing plates. The compositions include o-quinonediazide compounds and alkali-soluble resins. In addition, some of Nagashima's compositions contain inorganic particles, such as, silicon dioxide.

The particles in the compositions of Nagashima are not coated with a moiety having a protected acidic group. In contrast, claim 1 expressly recites that the inorganic particles in the claimed compositions are *coated with a moiety that has a protected acidic group*. Hence, the compositions of Nagashima are distinct from those of the invention, and do not provide the advantages of the claimed compositions. In particular, coating of the inorganic core particles with a moiety having a protected acidic group allows the particles to be *soluble* in alkaline

solutions upon removal of the protected group. For example, a photo acid generator (PAG) can be added to the photoresist composition to generate acid upon exposure to actinic radiation in order to cause the removal of the protected group.

Thus, claim 1 distinguishes patentably over the cited reference.

Claims 2-16 depend, either directly or indirectly, on claim 1, and hence are also patentable.

Independent claim 17 is directed to a method of processing a semiconductor substrate by coating the substrate surface with a photoresist composition having a resin binder, and an encapsulated material including inorganic core particles that are at least partially *coated with a moiety having a protected acidic group*. Selected portions of the coated surface are then exposed to an activating radiation to cause a chemical transformation in the exposed portions, and either the radiation-exposed or unexposed portions of the photoresist composition are removed. The substrate surface is then plasma etched to generate a pattern thereon.

As discussed above, the photosensitive composition of Nagashima do not include core particles that are coated with a moiety having a protected acidic group. Hence, Nagashima fails to teach a material feature of at least one step of the claimed method. Accordingly, Nagashima fails to anticipate claim 17.

The arguments presented above apply with equal force to establish that independent claims 18 and 19 are also patentable over the cited reference.

New Claims

Independent new claims 21-23 that depend on claim 1 not only incorporate the patentable features of claim 1, but also recite further distinguishing features. For example, claim 21 recites that the moiety having a *protected acid group* is *covalently* attached to the particles. As discussed above, Nagashima does not teach attaching such a moiety to the particles in its compositions.

Independent claim 24 recites a positive photoresist that includes a resin binder and an encapsulated inorganic material comprising core particles having an average size ranging from about 1 nm to about 50 nm, wherein the photoresist is *sufficiently base soluble* upon activation by radiation to function as a positive resist.

The particles utilized in compositions of Nagashima are *hydrophobic*, and are “*insoluble* in solvents which dissolve o-quinonediazide compounds and alkali soluble resins...” (emphasis added), *See* col. 4, lines 10-15 of Nagashima. Hence, compositions of Nagashima, which are utilized in printing plates, are not sufficiently base soluble, with or without exposure to activating radiation, to function as a positive resist. In fact, Nagashima states that if hydrophilic particles are employed for forming a lithographic printing plate, printing ink will adhere only with difficulty to image areas. *See* col. 4, lines 17-24. In contrast, applicant’s core particles are preferably hydrophilic to ensure that the photoresist composition is base soluble.

In other words, the particles in Nagashima are designed to be *insoluble* in solutions suitable for dissolving those portions of the photoresist compositions of the invention that have been exposed to activating radiation. Thus, resist processing of the compositions of Nagashima would lead to insoluble particles or residues, which is an unacceptable characteristic for a positive resist.

Accordingly, new claim 24, and claims 25 and 26, which depend on claim 24, are patentable over Nagashima.

CONCLUSION

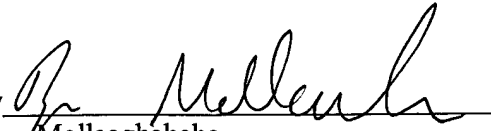
In view of the above remarks, Applicant respectfully requests reconsideration and allowance of the application. If there are any remaining issues, Applicant invites the Examiner to call the undersigned at (617)439-2514.

Application No.: 10/082,399

Docket No.: 101328-0165

Dated: September 26, 2003

Respectfully submitted,

By 

Reza Mollaaghababa

Registration No.: 43,810

NUTTER MCCLENNEN & FISH LLP

World Trade Center West

155 Seaport Boulevard

Boston, Massachusetts 02210-2604

(617) 439-2000

(617) 310-9000 (Fax)

Attorney for Applicant

1259629.1